PROVINCE OF ALBERTA

HIGH SCHOOL AND UNIVERSITY
MATRICULATION EXAMINATIONS BOARD.

DEPARTMENTAL EXAMINATIONS, 1927.

ALGEBRA 2.

Time—Three hours.

Values.

8 **1.** If to 8 quarts of milk containing 4% butter fat, a certain number of quarts of cream containing 20% butter fat is to be added so as to produce a mixture containing 16% butter fat, how many quarts of the cream must be added?

4 **2.** (*a*) Simplify:

$$\frac{x^2-(y-z)^2}{(x+z)^2-y^2}+\frac{y^2-(z-x)^2}{(x+y)^2-z^2}+\frac{z^2-(x-y)^2}{(y+z)^2-x^2}$$

3 (*b*) Solve:

$$\frac{x}{b}+\frac{x}{a-b}=\frac{a}{a+b}$$

4 **3.** Find the H.C.F. of:

$$x^6+8,\ x^4+2x^3-x^2+4x-6 \text{ and } x^4-4.$$

4 Find the L.C.M. of:

$$a^2-b^2,\ a^3-b^3,\ a^3-a^2b-ab^2-2b^3.$$

6 **4.** The horse power of a certain gasoline engine is denoted by $H=\frac{1}{6}D^2N$, where H=horse power
D=diameter of a cylinder in inches
N=number of cylinders.

Solve this formula for D.

Compute, to three places of decimals, the diameter of the cylinder of a 20 horse-power engine of 6 cylinders.

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Values.

4 **5.** (*a*) When $X=2+\sqrt{3}$, $Y=2-\sqrt{3}$, find the value of

$$\frac{2X+Y}{X-Y}+\frac{X-2Y}{X+Y}$$

4 (*b*) Show that

$$\frac{1}{\sqrt{16+2\sqrt{63}}}+\frac{1}{\sqrt{16-2\sqrt{63}}}=3.$$

7 **6.** Simplify:

$$\frac{a^{\frac{3}{4}}b^{\frac{1}{2}}}{c^{\frac{1}{3}}}\times\frac{a^{-\frac{1}{4}}c^{-\frac{1}{3}}}{b^{-\frac{1}{3}}}\div\frac{a^{-\frac{1}{2}}b^{-\frac{1}{6}}c^{-\frac{2}{3}}}{c}$$

8 **7.** Solve for x and y:

$$\frac{1}{x}-\frac{1}{y}=\frac{1}{3}$$

$$\frac{1}{x^2}+\frac{1}{y^2}=\frac{5}{9}$$

8. Determine the value of k in each of the following:

3 (*a*) $x^2+4x+k=0$ if one root is three times the other.

3 (*b*) $x^2+kx-6=0$ if one root exceeds the other by 5.

3 (*c*) $x^2+kx-1=0$ if the roots differ only in sign.

4 **9.** (1) Solve the equation: $mx^2+nx+c=0$.

6 (2) If P and Q are the roots of the equation $ax^2+bx+c=0$,

find PQ, $P+Q$, $\frac{P^2}{Q}+\frac{Q^2}{P}$ in terms of abc.

10 **10.** Two rectangles contain the same area, 960 sq. yds.; the difference of their lengths is 8 yards, and of their breadths 6 yards. Find their sides.

10 **11.** A man bought a certain number of shares of railway stock for $6600.00. The next day they declined in value $12.00 a share, when he could have bought five shares more for the same amount. Find the price paid per share?

Values.

3 **12.** (*a*) Show geometrically that two equations of the first degree can have only one set of roots.

6 (*b*) Solve graphically:

$$x^2+y^2=25.$$

$$2x-y=5.$$

From the co-ordinates of each point of intersection give a set of roots that satisfy the equations.

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